

Capturing the Heritage of British Colonial School Building Through Measured Drawings in Malaysia

A Case of PULAPOL Batu Lama School

*Asiah Abdul Rahim¹, Srazali Aripin², Abdul Razak Sapian³, Hazwan Zubir⁴

^{1, 2), 3), 4)} Department of Architecture, Kulliyah of Architecture & Environmental Design, International Islamic University Malaysia, Kuala Lumpur, Malaysia

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Corresponding author:
Asiah Abdul Rahim
arasiah@iiu.edu.my



Abstract – This research is to convey the analytical studies of the Pusat Latihan Polis (PULAPOL) Batu Lama School. This research aims to present detailed information of the endogenous influences, particularly during the British colonization era. PULAPOL was the first Police Training Centre in Malaysia. It is located at Jalan Sultan Yahya Petra, Kuala Lumpur. It was constructed in 1938. The structural system used for the school's construction was load-bearing brick masonry. The objectives of the studies are to: a) Increase the understanding and appreciation of Architectural Heritage of the Muslim World, b) Learn the techniques of measured drawings of heritage buildings with the emphasis on the building construction, detailing, research and documentation of the historical aspects of the building and its development, c) Appreciate the total concept and richness of the architectural heritage as well as to be able to value the environment and to understand the socio-economic-cultural way of life of local inhabitants. In general, the methodology adopted for the study is divided into pre-fieldwork, fieldwork and post-fieldwork. Data collected from interviews, case studies, observations, and measurements of the building. The data obtained from various methods are documented in reports and measured drawing. In conclusion, these research findings provide the chronology and history of the PULAPOL Batu Lama School that is rich in its historical values, materials used, construction techniques and passive design techniques.

Keywords: *architectural heritage, colonial architecture, construction, passive design*

I. INTRODUCTION

Batu Lama School is a school division in the police-training centre, or Pusat Latihan Polis (PULAPOL), to serve all academic affairs for the trainees. This school is located within the PULAPOL boundaries, the oldest police academy located at Jalan Sultan Yahya Petra. Batu Lama School and 26 other buildings in PULAPOL had been gazetted under National Heritage Act 2005 that prove to be significant historical events occurred during the British colonial era.

Pusat Latihan Polis (PULAPOL) Kuala Lumpur was the first police-training centre in Malaysia, formed by Captain Graham, the Malay states guides' officer (Pusat Latihan Polis Kuala Lumpur, 2004).

The training centre was formerly known as Police Depot and initially located in Bluff Road, later renamed as Jalan Bukit Aman. Currently, it is the location of Police Headquarters Bukit Aman. Initially, the site was strategic for the previous Malay States Guides Headquarter in Kuala Lumpur (Bakar, 2017). The capacity of trainees kept increasing, thus, in 1920 a new location was proposed to relocate the training centre. However, it was postponed due to economic depression until it was reviewed five years later. An area was chosen in Gurney Road, and the construction of the new police training centre was conducted throughout the 1930s (Pertubuhan Akitek Malaysia, 2007). After the construction had been completed in October 1940, PULAPOL in Bluff Road was transferred to Gurney Road, currently known as Jalan Sultan Yahya Petra, Kuala Lumpur (Khalid Abu Bakar, 2017).

During the early stages of PULAPOL development, Batu Lama School was one of the first buildings constructed by the British. It is also the most notable among the 27 historical buildings in PULAPOL in terms of its scale, design, and functionality. The long service term of this building to PULAPOL occupants gave a thousand reminiscences of old memories, especially to police cadets who have gone through the training. The class was where they studied, and the hall bears witness to the historical moment of recognition to the end of the police cadet's endeavours through their graduation ceremony. The building, PULAPOL Batu Lama School, was selected for the study due to its prominent architectural features. There is no official research or written documents about the magnificent colonial architecture. Despite that, there is some architectural information about the Batu Lama School. However, it is limited and troublesome to be accessed. All data on the building had been confiscated and brought away by the British as highlighted by Boyd & Rice (2014),

"To date there has not been a comprehensive study of these colonial buildings and many of the architectural drawings sent to the Colonial Office remain unpublished but survive in the National Archives, London, England. Not only do the building types reappear, but the names of the British colonial settlements were also repeated, giving a clear indication of their British origins." (pg.88)

As a result, while little detail is preserved to identify the building's origin, the distinctive aspect of the architecture itself is sufficient to portray the British style being pushed along to the growth of their colonies.

II. METHODOLOGY

The methodology adopted in this study is based on the qualitative and quantitative approaches. The data collections for qualitative methods are from interview, case study, and observation, while quantitative methods involve numerical data and measurements of the building. The data collection of the Batu Lama School was documented into four aspects: a) report, b) technical, c) multimedia, and d) cataloguing. Each team was assigned different tasks during the fieldwork to collect the data. The report team is responsible for gathering historical and architectural-related information regarding Batu Lama School. The data were collected through interviews, taking notes on-site, capturing the essential aspects in every detail, producing on-site sketches, collecting books, articles, and journals that would enhance the report's content for further understanding. As for the technical team, the tasks were to measure every aspect of the building related to architectural features and site boundary, perimeter, and height. A 3D computerised model and physical models of the building were also produced according to the appropriate scale and measurement. The multimedia team was responsible for taking photographs and videos of the school. The catalogue team was in charge of the compilation of all collected information. The information consists of sketches, drawings, photos, multimedia recordings, books, and measured drawings by categorising and organising all data collected through cataloguing. All drawings, reports, and documents containing significant decorative features, architectural features, and materials were documented using rubbing, sketching, photography, and digitising methods. All data gathered will then be documented into reports and drawings.

III. RESULTS AND DISCUSSION

Batu Lama School carries the hybrid architecture, which fused the prominent British colonial style with elements of local context. The design concept can be seen through form, scale, and proportion applied to depict the solid and sturdy appearance of a historical building, complemented with vibrant building materials. The school's structure is balanced and symmetrical on both sides, forming a 'T' shape,

as depicted in Figure 1. It is a two-level building with a floor height of 3.7 metres. Batu Lama School adheres to the educational building concept, which is that the design carefully examines its usefulness to guarantee that the building meets the demands of the user. The purpose of the school is essential to its time of service, beginning with its first operation and ending with its deactivation.



(a) Top view of Sekolah Batu Lama



(b) Front view of Sekolah Batu Lama

Fig. 1. (a) and (b). Top view and front elevation portray the overall form of Sekolah Batu Lama

A. Evolution of Sekolah Batu Lama

Due to the increased number of recruits, the building of Sekolah Batu Lama saw incremental changes in its surrounding setting. Architecturally, there was no significant alteration done on the features of the building, yet it changes in terms of function of the interior space. The modifications that occurred at Batu Lama School included the construction and demolition of a few structures over the years to satisfy academic affairs' needs. Minor renovations were also made to the interior of the building to meet the demands of the trainees, lecturers, and trainers life. Despite its minimal design features, all of the changes executed demonstrate that Batu Lama School mainly emphasizes its functionality and structure efficiency to provide a conducive environment for the end-user. Table 1.0 and Figure 2. describe the evolution of the context and interior changes according to the consecutive years.

Table 1. The timeline of changes in the building of Sekolah Batu Lama and its context

Year	Description
1938	The construction of Batu Lama School started.
1940	Batu Lama School fully operated as a sole school in PULAPOL.
1971	Wooden blocks behind Batu Lama School turned into classrooms for trainees and four new school blocks were also constructed for sufficient classrooms.
1991	Changes of interior space to provide more administrative offices.
2007	The first floor was renovated into a lecturers' room.
2012	Current academic complex construction completed.
2013	All spaces inside Batu Lama School were transferred into the current academic complex and ceased operation.

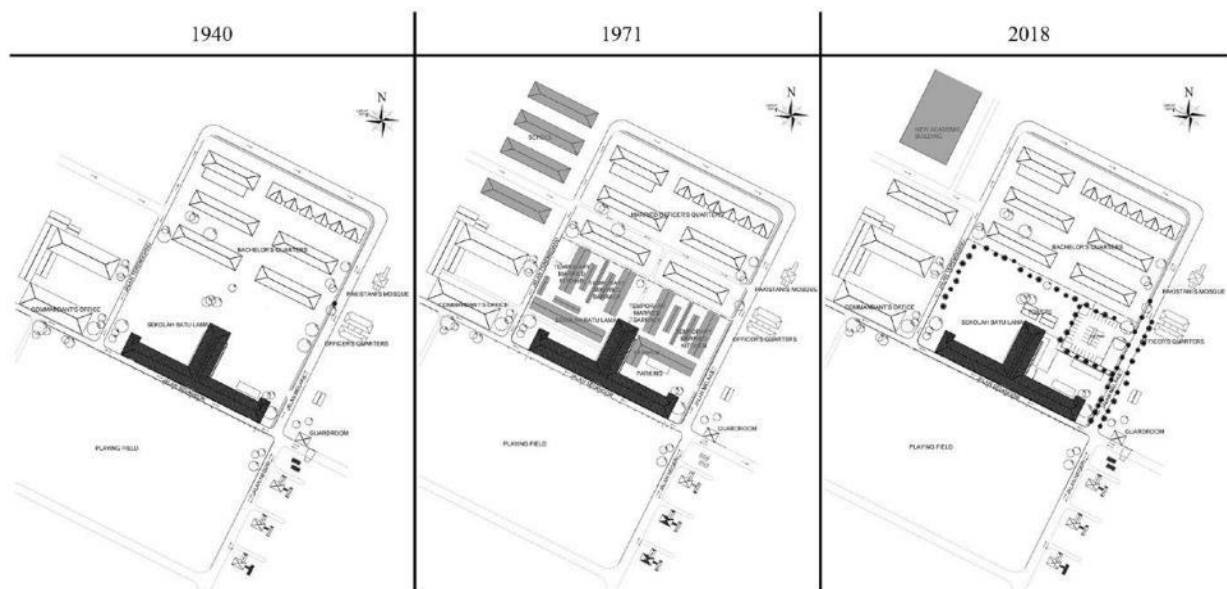


Fig. 2. The evolution of Batu Lama School academic blocks' function and its surrounding changes according to the year.

Source: Kulliyyah of Architecture & Environmental Design (KAED) (2018)

The orientation is noteworthy heading towards the Qibla direction. Good orientation, particularly for a hot and humid country like Malaysia, is critical as it provides thermal comfort to the residents. Moreover, a proper orientation helps to minimize energy consumption, such as electric lighting, air conditioning systems, and so on (Amado, 2013).

Batu Lama School consists of two blocks, the academic block, and the multipurpose hall. The space in the academic block is divided into two; the right-wing and the left-wing. Both spaces are designed symmetrically and in balance, arranged on both sides in terms of size, shape, and appearance, which can be seen in the elevation and floor plan of the building. The multipurpose hall has one ample space but is separated into three different areas: stage, preparation, and seating. The building's lobby and the hall are the left and right-wing intersection point. Each side of the building has five large rooms and one small room with the same function and size. At the end of each wing, there is a toilet and storage area. The academic block comprises two levels with a similar space arrangement to the ground floor with a height of 3.7 metres. Meanwhile, the multipurpose hall only consists of one level. Figure 3. depicts the Ground Floor Plan of the Batu Lama School and Figure 4. the building elements of the school.

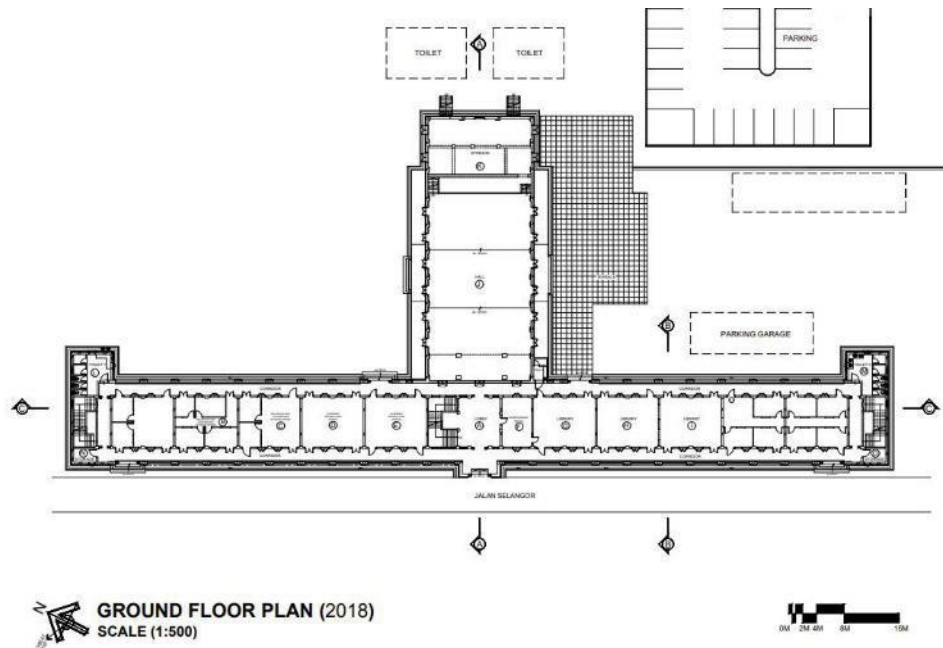


Fig. 3. Ground Floor Plan of Batu Lama School (2018)



Fig. 4. Photos of Building Element of Batu Lama School (2018)

B. Structural System

Batu Lama School was built in 1938, under the British rule (Ahmad, 1997). Load-bearing masonry building was at its pinnacle during that period hence the primary type of structural system employed for the school's construction was load-bearing brick masonry. The foundation, load-bearing walls, post, and beam used in Batu Lama School were other structural systems under study.

The foundation applied in Batu Lama School is a strip foundation. The load-bearing wall feature is evidence as strip foundation is usually built with the load-bearing wall system (Flynn, 2013). The bottom part of the building exposed to the wall with a height of 420 mm from the ground is also proof to define the use of strip foundation. It is constructed along the perimeter of the building as it is a

continuous strip, which is formed centrally under load-bearing walls. Figure 5. displays the strip foundation used as the foundation of the Batu Lama School.



Fig. 5. The lower part of the building that is exposed as the proof of strip foundation

Load-bearing wall construction is implemented in the construction of Batu Lama School, which mainly features a thick, heavy masonry wall supporting the load of the building and, at the same time, acts as the main structural element as provided in Figure 6. One of the advantages of a load-bearing wall is its ability to resist fire (Zulkifli, 2017; Swarup, 2006). The walls were built with bricks of various thicknesses, appropriate to bear the load. For Batu Lama School, the thickness of the wall is 400 mm. Bricks are well-known for their various considerable advantages that will serve the building for hundreds of years.

Bricks do not rot, rust, fire, and insect resistance and have a low maintenance cost. The use of bricks is also favourable over other materials due to their ability to act as thermal and acoustic insulation. They are a good replacement tool for conservation purposes. However, small damp might as well give effects to the bricks since it will need to be treated at greater length below (State Heritage Branch, 2008).



Fig. 6. Load-bearing wall is used to construct the building

Batu Lama School also applies a frame structure system in the interior part of the building. A frame structure consists of a frame skeleton of reinforced concrete. It combines horizontal parts called beams and the vertical parts known as columns. The reinforced concrete columns erected on the floor slab are directly connected to the concrete foundation under the ground. They transfer the continuous loads of the building into the ground. The columns are arranged according to a grid arrangement based on the rectangular layout from left to right with a distance of 4.5 metres from one column to another.

The most prominent feature of Batu Lama School is the roof construction. The school comprises an academic block and a multipurpose hall utilising a bonnet roof. This type of roof consists of two different slopes on all four sides. It combines two different types of roof truss structures with two distinct angles (33 and 41 degrees). Its features include the lower slope being less steep than the upper slopes drawn in Figure 7. It gives advantages to tropical countries because it provides outstanding shade for the building and protection against heavy rain. The building of Sekolah Batu Lama roof is also designed to suit the humid tropical climate, usually high pitched and overhanging (Chun et al., 2005).

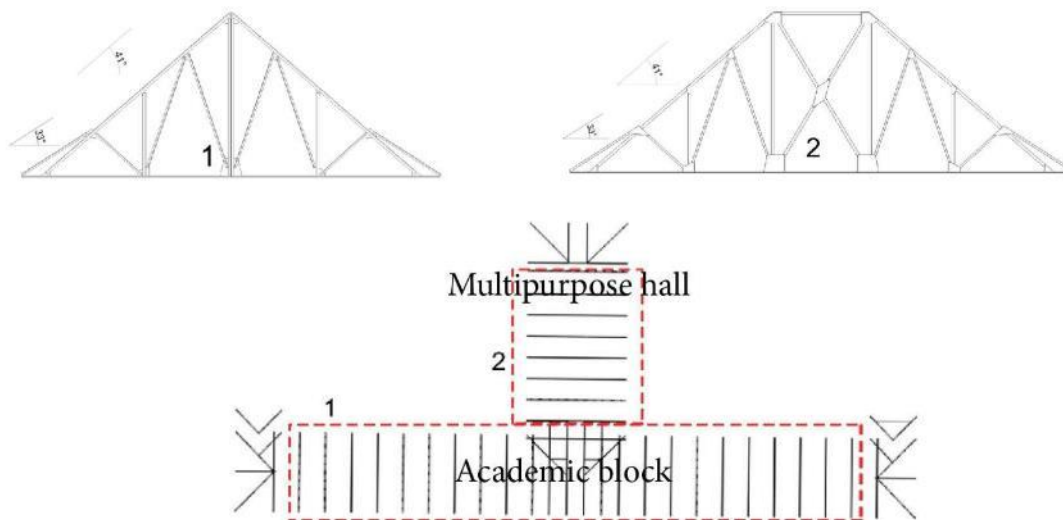


Fig. 7. Type of roof trusses used at the multipurpose hall and academic block

Source: Kulliyyah of Architecture & Environmental Design (KAED) (2018)

C. Passive Design

Aesthetically, British colonial architecture is essentially hybrid. Occasionally, it will adapt the environmental aspects, including the climate context and resources of construction materials to the building design itself (Ahmad, 1993; Hassan et al., 2017). British colonial architecture considers the context of the location. Since the school is composed of bricks and concrete, both of which have a large thermal capacity, local adaptive consideration of the building must be considered a passive design method to provide practical thermal comfort. Considering Malaysia is a hot and humid country, numerous elements are taken into account. Lim (1987) suggested that solar radiation, high temperatures, glare, and humidity are all elements contributing to climatic stress. Aside from the rain, floods, and the odd high wind, those aspects must be handled to provide climatic comfort in a structure.

1) Sun Shading

The school features corridors on the ground and first-floor. The corridor encircles the whole floor, making two entrances for the classrooms, as shown in Figure 8. The function of the veranda in tropical houses is not only to serve social needs but also to provide thermal comfort into the interior space effectively (Ahmad, 2000; Givoni, 1994). It is a fact that the use of a veranda has also been applied in the British's colonial empire by the Royal Engineers as mentioned by Weiler (1996), "The open verandah extending from eave to ground floor, and usually encircling, was the standard practice in Corps designs for providing protection from the sun and partial protection from the rain." (Weiler, 1996: p.15). Like Batu Lama School, the encircling corridor acts as a threshold to the space inside, resulting in the indoor temperature being cooler than its atmosphere. This is because the corridor provides shade from the sun, glare, and reduces the solar radiation level, which are the factors that contribute to the thermal comfort of the occupants (Zin et al., 2012).

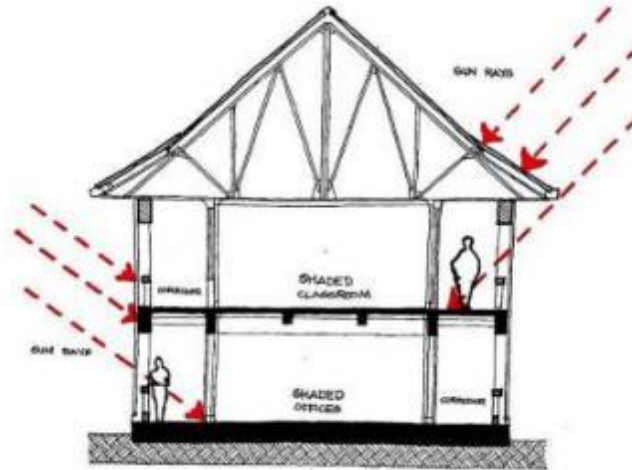


Fig. 8. The encircling corridor acts as shading device that protects the building from sun and rain
Source: Kulliyyah of Architecture & Environmental Design (KAED) (2018)

2) Natural Ventilation

The corridor also receives natural fresh air that will provide a better thermal comfort, subsequently improving the indoor temperature. A veranda or corridor is a space known as semi-open or semi-enclosed with no solid wall; thus, the natural air will flow through (M. H. M. Zin et al., 2012). Wall openings and doors have always contributed to achieving adequate natural ventilation in Batu Lama School. The openings at both sides of the classrooms' wall have encouraged cross ventilation inside the space, as shown in Figure 9. The air from the outside is allowed to penetrate the spaces resulting in the cool air to remove the hot air from the building. The school is also designed with an extended plan and minimal interior partitions, which can reduce the restriction of air movement in the space. The air velocity is vital to ensure sufficient amount of natural air to flow into the building as mentioned by Tahir et al. (2010: p. 52), "The air velocity helps to increase the efficiency of sweat evaporation, and thus avoid discomfort due to moisture on the skin" .

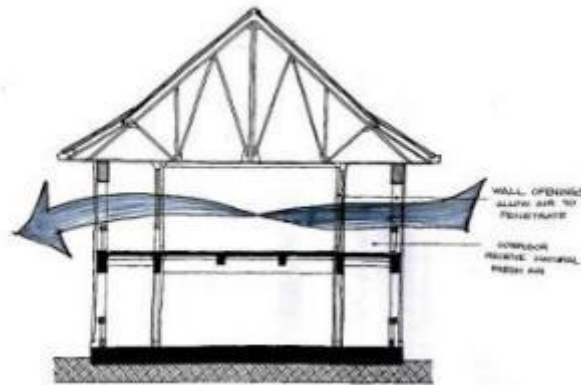


Fig. 9. Airflow through the corridor into the class forming cross ventilation
Source: Kulliyyah of Architecture & Environmental Design (KAED) (2018)

3) Daylighting

The construction of Batu Lama School has considered the use of natural daylight in the design by having a series of arches on the exterior wall and large openings to allow the penetration of sunlight into the corridor, as drawn in Figure 10. Instead of depending on artificial lighting, these openings can effectively channel the natural light into the interior space, reducing energy consumption. Batu Lama School features large windows and doors at both sides of the classrooms in the academic block. The natural light will penetrate through the arches and corridor to the wall openings and then enter the classrooms. In addition, the multipurpose hall, known as Dewan Satu, has a series of rounded windows situated at the upper part of its brick wall. These windows allow daylight into the building to maximize visual comfort and avoid glare.



Fig. 10. Arches and large window openings

IV. CONCLUSION

Batu Lama School is a prominent feature of British colonial architecture. The British colonial architecture is essentially hybrid, which adapts to the surroundings to suit the local hot and humid climate. The aspects of tropical architecture are also elaborately implemented in the construction of the building. The application of passive design strategies in the building made the indoor spaces have lower temperatures than the external surrounding. This helps the users to achieve thermal comfort.

The architecture of the building as a whole portrays the powerful image of the police administration. The exceptional use of materials has made the building stand firm despite its age. The British Royal Engineers had succeeded in implementing elaborate engineering mechanisms to produce a remarkable architecture marked in today's history. The adept builders with outstanding skills have also made the building appear more appealing with exceptional quality. The building is not heavily decorated with ornamentation because it focuses more on function than aesthetic values.

Limited information was obtained due to the limited sources available, as there was no comprehensive documentation. Thus, the information was collected from books and available documentation from the libraries of Pusat Sumber PULAPOL, National Library Malaysia (PNM), and National Archive Malaysia. Apart from that, some of the information were gathered from an interview with the administrative officials and the training officials of PULAPOL. The restriction was a barrier to understanding the obtained written sources during the research. There were restrictions in obtaining the information due to authorised permission for access. The authorisation process took time to be approved.

The building of Sekolah Batu Lama is perceived as the epitome of patriotism, where a significant number of armies are born. The building itself portrays a strong sense of conceitedness to display its role as something that is nothing as impotent but mighty in its power. The execution of the building marks the initial effort of bringing peace to Malaysia. The accomplishment of the study gives awareness on the importance of preservation and conservation of heritage buildings because these historical gems will be beneficial for future research.

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